

CLAIMS

What is claimed is:

1. An isolated polynucleotide comprising:

- (a) a nucleotide sequence encoding a polypeptide having dihydroflavonol-4-reductase activity, wherein the polypeptide has an amino acid sequence of at least 80% sequence identity, based on the Clustal V method of alignment, when compared to one of SEQ ID NO:4, 6, 8, 12, 14, or 16, or
- (b) a complement of the nucleotide sequence, wherein the complement and the nucleotide sequence consist of the same number of nucleotides and are 100% complementary.

2. The polynucleotide of Claim 1, wherein the amino acid sequence of the polypeptide has at least 85% sequence identity, based on the Clustal V method of alignment, when compared to one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

3. The polynucleotide of Claim 1, wherein the amino acid sequence of the polypeptide has at least 90% sequence identity, based on the Clustal V method of alignment, when compared to one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

4. The polynucleotide of Claim 1, wherein the amino acid sequence of the polypeptide has at least 95% sequence identity, based on the Clustal V method of alignment, when compared to one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

5. The polynucleotide of Claim 1, wherein the amino acid sequence of the polypeptide comprises one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

6. The polynucleotide of Claim 1 wherein the nucleotide sequence comprises one of SEQ ID NO:3, 5, 7, 11, 13 or 15.

7. A vector comprising the polynucleotide of Claim 1.

8. A recombinant DNA construct comprising the polynucleotide of Claim 1 operably linked to at least one regulatory sequence.

9. A method for transforming a cell, comprising transforming a cell with the polynucleotide of Claim 1.

10. A cell comprising the recombinant DNA construct of Claim 8.

11. A method for producing a plant comprising transforming a plant cell with the polynucleotide of Claim 1 and regenerating a plant from the transformed plant cell.

12. A plant comprising the recombinant DNA construct of Claim 8.

13. A seed comprising the recombinant DNA construct of Claim 8.

14. An isolated polypeptide having dihydroflavonol-4-reductase activity, wherein the polypeptide has an amino acid sequence of at least 80% sequence

identity, based on the Clustal V method of alignment, when compared to one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

15. The polypeptide of Claim 14, wherein the amino acid sequence of the polypeptide has at least 85% sequence identity, based on the Clustal V method of alignment, when compared to one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

16. The polypeptide of Claim 14, wherein the amino acid sequence of the polypeptide has at least 90% sequence identity, based on the Clustal V method of alignment, when compared to one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

17. The polypeptide of Claim 14, wherein the amino acid sequence of the polypeptide has at least 95% sequence identity, based on the Clustal V method of alignment, when compared to one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

18. The polypeptide of Claim 14, wherein the amino acid sequence of the polypeptide comprises one of SEQ ID NO:4, 6, 8, 12, 14, or 16.

19. A method for isolating a polypeptide having dihydroflavonol-4-reductase activity comprising isolating the polypeptide from a cell or culture medium of the cell, wherein the cell comprises a recombinant DNA construct comprising the polynucleotide of Claim 1 operably linked to at least one regulatory sequence.

20. A method of altering the level of expression of a dihydroflavonol-4-reductase in a host cell comprising: (a) transforming a host cell with the recombinant DNA construct of Claim 8; and (b) growing the transformed host cell under conditions that are suitable for expression of the recombinant DNA construct wherein expression of the recombinant DNA construct results in production of altered levels of the dihydroflavonol-4-reductase in the transformed host cell.

21. A method for evaluating at least one compound for its ability to inhibit dihydroflavonol-4-reductase activity, comprising the steps of:

- (a) introducing into a host cell the recombinant DNA construct of Claim 8;
- (b) growing the host cell under conditions that are suitable for expression of the recombinant DNA construct wherein expression of the recombinant DNA construct results in production of a dihydroflavonol-4-reductase;
- (c) optionally purifying the dihydroflavonol-4-reductase expressed recombinant DNA construct in the host cell;
- (d) treating the dihydroflavonol-4-reductase with a compound to be tested;
- (e) comparing the activity of the dihydroflavonol-4-reductase that has been treated with a test compound to the activity of an untreated dihydroflavonol-4-reductase; and
- (f) selecting compounds with potential for inhibitory activity.